

# **HASTINGS VACUUM GAUGES**

## **MODEL NV-100**

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*Hastings Instruments reserves the right to change or modify the design of its equipment without any obligation to provide notification of change or intent to change.*

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## **GENERAL**

The Hastings Model NV-100 Vacuum Gauge is a complete self contained instrument with all circuits mounted on the rear of the meter case. A remote type DV-100 gauge tube is used as the pressure sensor. The instrument measures pressures over the range of 0.1 to 100 Torr utilizing the well known Hastings directly heated thermopile. Unlike other Hastings gauges, this instrument operates in a constant temperature mode rather than constant applied voltage. The changes in power to create a constant temperature rise above ambient are measured by the indicating meter as a function of pressure. Corrections for gasses of differing thermal conductivities are necessary as in all thermal conductivity type vacuum gauges.

## **INSTALLATION**

The instrument is factory calibrated and ready for use when received. All that is necessary to place the gauge in operation is to install the gauge tube into the system, plug in the gauge tube cable, and connect the power cord to the AC line. Gauge tubes should be installed with the open end pointing downward so as to be self draining. On dusty or dirty systems, a Hastings particle drop-out (protective) trap is recommended (see Product Bulletin #352).

## **OPERATION**

The gauge is in operation once connected to the gauge tube and power. An initial check of the mechanical meter zero may be necessary upon receipt. To do this, unplug the power cord and set (if necessary) the meter mechanical zero adjustment the front of the meter to read "ATM". On the rear of the instrument are two calibration adjustments, they should be correct as received. An occasional check of the ATM adjustment may be desirable. Also, anytime a new gauge tube is replaced it is desirable to reset the ATM adjustment.

To do this, expose the tube to atmospheric pressure after the gauge is fully warmed up (about 30 minutes) and adjust the trim potentiometer marked ATM until the needle reads ATM. Use of a trim potentiometer tuning tool will facilitate this adjustment.

*NOTE:* When turned off, the meter needle rests at the right side of the meter (ATM mark).

When no tube is plugged in, the instrument reads off the scale below zero. If a broken gauge tube is plugged in it will read off scale above ATM. Replace with a new gauge tube.

The circuit has a protective shut-down circuit. This shuts down the electronics whenever a gauge tube is not plugged into the socket. This is to prevent burning out gauge tubes by application of excessive power surges when plugging in or unplugging gauge tubes. A delay circuit applies power gently when connected. Pins 1 and 2 of the gauge tube activate the circuit and act as the interlock switch. Thus the instrument will not operate unless the correct gauge tube is used. Troubleshooting the circuit on a bench cannot be accomplished unless these two pins are jumpered at the gauge tube socket, or a DV-100 gauge tube is plugged into the socket.

## **TROUBLE SHOOTING**

If troubles develop, always try a new gauge tube before suspecting other problems. To check gauge tubes for continuity of thermocouples, first make sure that the gauge tube is at atmospheric pressure, then using an ohmmeter check for continuity between pins 3,5 and 7. Approximately 10 ohms resistance is read between all combinations of these three pins on a good tube. If open, replace the tube. Never check while under vacuum as the ohmmeter may burn out the gauge tube. Pins 1 and 2 should show zero ohms. Trouble shooting the electronics is difficult because this is a closed loop feed-back circuit. If circuit problems develop, it is best to return it to the factory for repair.

## ***CALIBRATION***

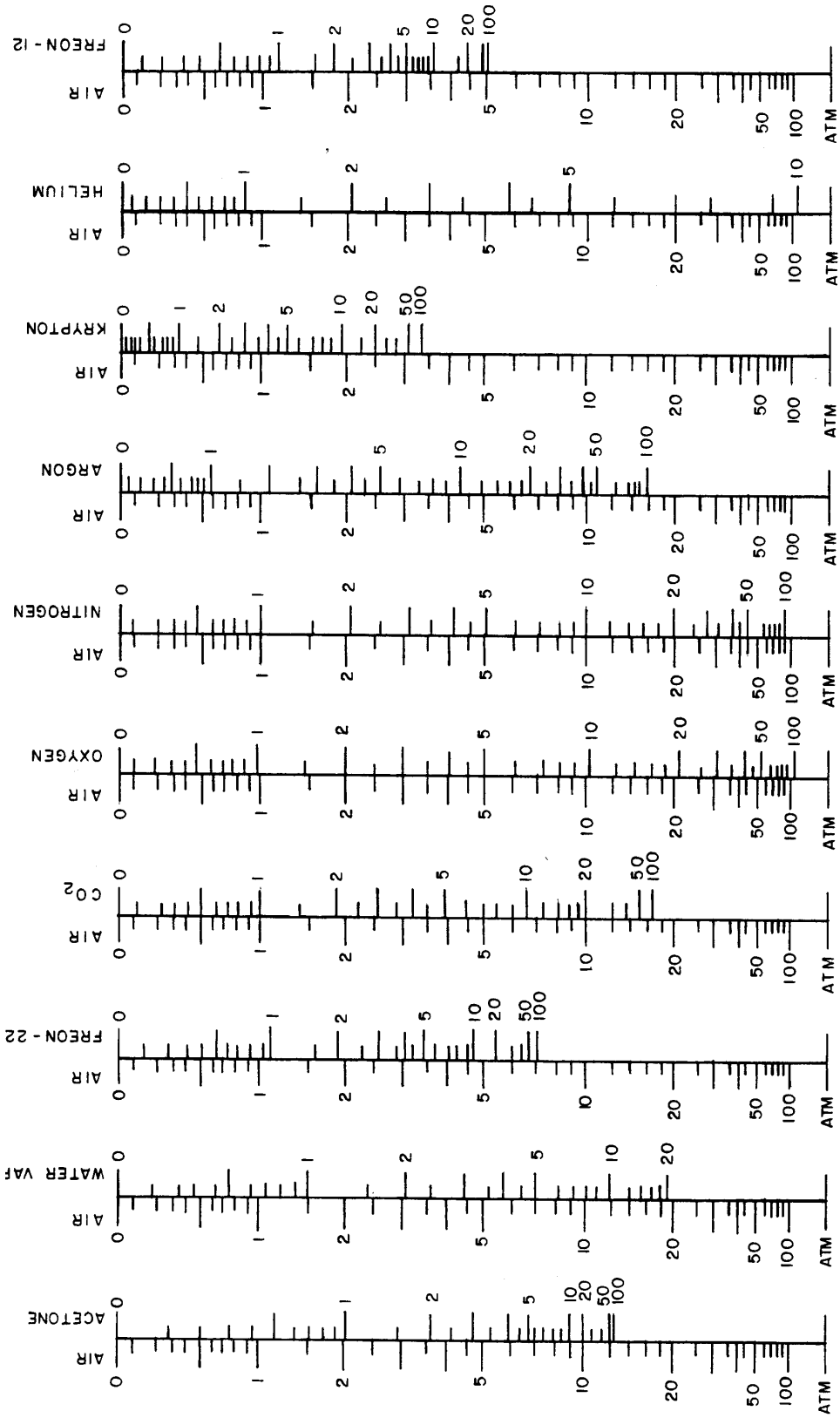
Calibration is relatively easy with this gauge, since a pressure of only 10 microns Hg (10 millitor) or lower is all that are required. It need not be known accurately as long as it is this low or lower. A good clean, dry, compound mechanical vacuum pump can achieve this pressure if the oil is clean and fresh and the volume of the system small.

1. Check mechanical meter zero with the gauge turned off. Set to read ATM if necessary with screw adjust in lower left center of meter
2. Turn on and allow about 30 minutes warm-up. With gauge tube at atmospheric pressure, set the trim potentiometer in the rear marked "ATM" until the meter needle reads ATM.
3. Pump down to 10 microns Hg or lower. Allow sufficient time to outgas the tube after exposure to ATM in (2) above. Set "ZERO" adjust trim potentiometer in the rear until the meter reads "0" pressure.

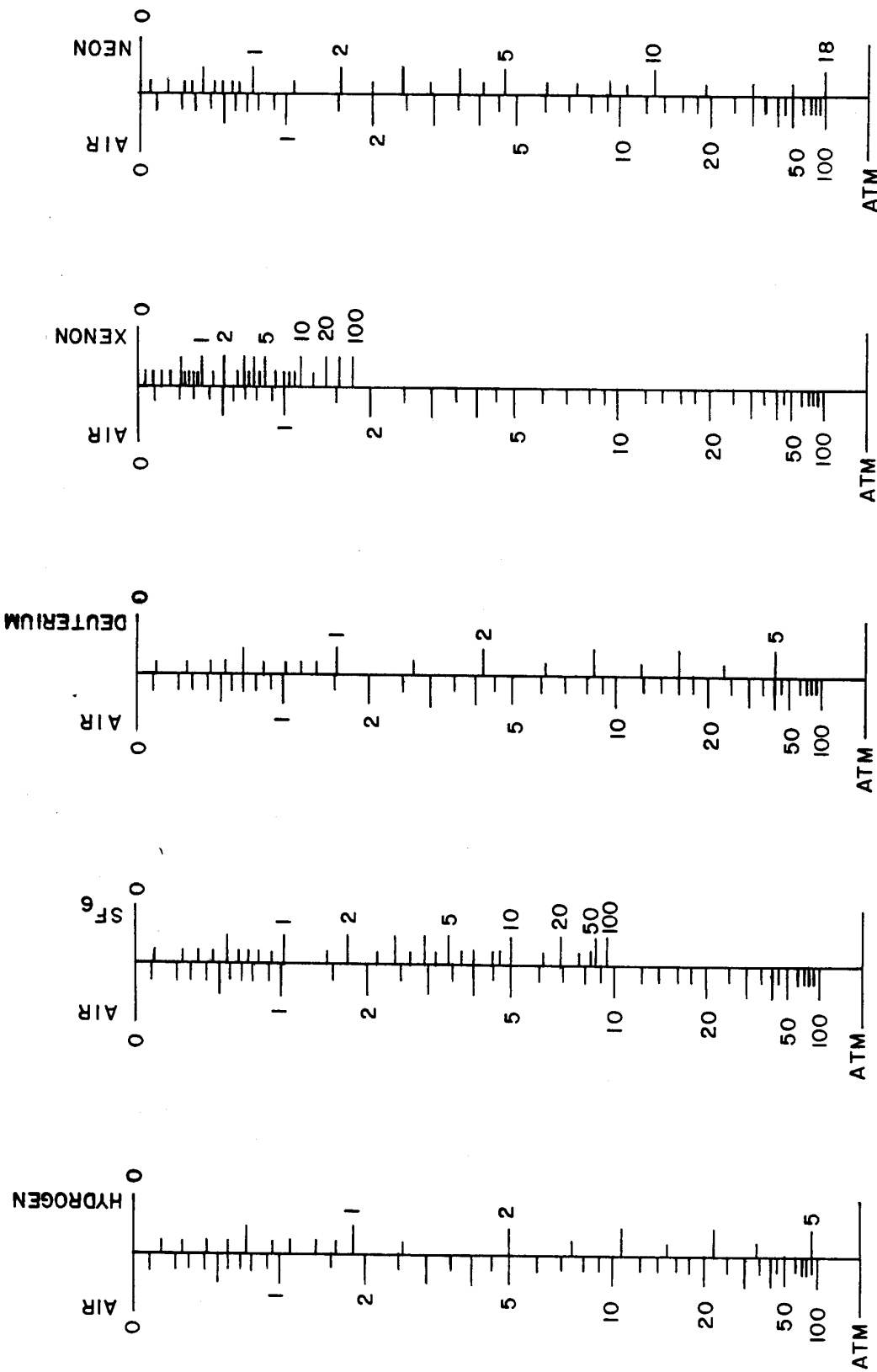
Calibration is now complete. Repeat 2 and 3 if desired for a final trim.

## ***EXTENSION CABLES***

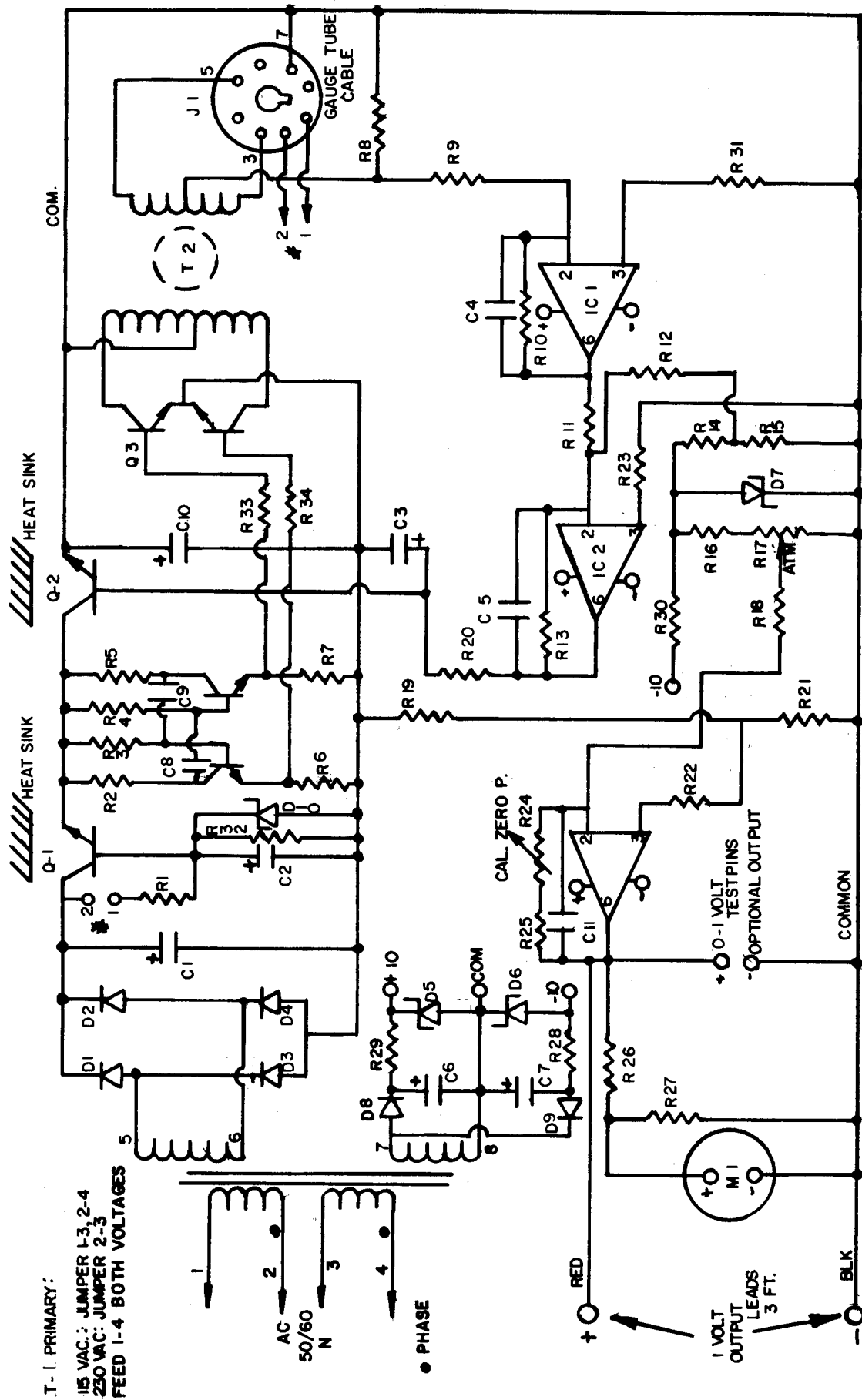
A maximum of 12 ft extension may be used provided recalibration of the ATM and span adjustments are accomplished. Extension cables are of the type "OMS-(length)-OFS" and are available from Hastings Instruments. A 5 wire cable of no less than #18 wire is required. Hastings provides an extension of 12 ft.



NOMOGRAM SHOWING CALIBRATION OF HASTINGS VACUUM GAUGES WHICH USE THE DV-100 GAUGE TUBES FOR THE GASES SHOWN ABOVE. TO FIND THE PRESSURE IN A GAS OTHER THAN AIR, LOCATE THE OBSERVED READING ON THE "AIR" SIDE OF THE APPROPRIATE SCALE AND READ, ON THE OPPOSITE SIDE OF THE SCALE, THE TRUE PRESSURE IN MICRONS OF MERCURY FOR THE GAS BEING MEASURED.



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**Service Form:**

TBE / Hastings Instruments  
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RMA# \_\_\_\_\_  
(contact factory)

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ P.O. No. \_\_\_\_\_ Date \_\_\_\_\_  
Name \_\_\_\_\_ Phone \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Describe problem: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Show a block diagram of your system including unit inlet and outlet pressures:

Calibration range \_\_\_\_\_ Gas \_\_\_\_\_ Cable length \_\_\_\_\_  
Power line voltage \_\_\_\_\_ Variation \_\_\_\_\_  
Ambient temperature \_\_\_\_\_ Gas Temperature \_\_\_\_\_  
Other \_\_\_\_\_  
(If special modifications have been made by user, please describe): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Application of product being returned \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Has this product been used with a hazardous material?      YES      NO

If YES, please list types of gas, chemicals (common names, specific chemical), biological materials, or other potentially harmful materials exposed to the product during its use (attach additional page if necessary) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PRODUCTS EXPOSED TO RADIOACTIVE MATERIAL CANNOT BE ACCEPTED BY HASTINGS INSTRUMENTS UNDER ANY CIRCUMSTANCES.**

Signature of Hazards Control Officer: \_\_\_\_\_

For questions regarding use of the product and materials in contact with it:

Name \_\_\_\_\_ Phone \_\_\_\_\_